US011779091B2

(12) **United States Patent**
Siu

(10) **Patent No.: US 11,779,091 B2**
(45) **Date of Patent: Oct. 10, 2023**

(54) **HAIR STYLING APPARATUS WITH ION EMITTER**

(71) Applicant: **CONAIR CORPORATION**, Stamford, CT (US)

(72) Inventor: **Kwan Shing Benny Siu**, Tseung Kwan O (HK)

(73) Assignee: **Conair LLC**, Stamford, CT (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 214 days.

(21) Appl. No.: **16/996,084**

(22) Filed: **Aug. 18, 2020**

(65) **Prior Publication Data**

US 2022/0053902 A1 Feb. 24, 2022

(51) **Int. Cl.**
A45D 1/02 (2006.01)
A45D 1/14 (2006.01)

(52) **U.S. Cl.**
CPC ***A45D 1/14*** (2013.01); ***A45D 1/02*** (2013.01); *A45D 2200/202* (2013.01)

(58) **Field of Classification Search**
CPC ... A45D 1/00; A45D 1/02; A45D 1/04; A45D 1/06; A45D 1/08; A45D 1/10; A45D 1/14; A45D 1/16; A45D 1/20; A45D 2/00; A45D 2/001; A45D 2/02; A45D 2/04; A45D 2/06
USPC 401/137–139; 132/222–225, 269, 272
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

7,478,640	B2	1/2009	Saida et al.	
2005/0172979	A1*	8/2005	Saida	A45D 1/04 132/228
2005/0224091	A1*	10/2005	Cafaro	A45D 1/04 132/228
2006/0076032	A1*	4/2006	Fung	A45D 1/06 132/224
2006/0108344	A1*	5/2006	Kim	A45D 20/50 392/379

(Continued)

FOREIGN PATENT DOCUMENTS

AU	2011202604	A1	6/2011
CN	102987701	A	3/2013

(Continued)

OTHER PUBLICATIONS

CN203575843U. Machine Translation (Year: 2014).*

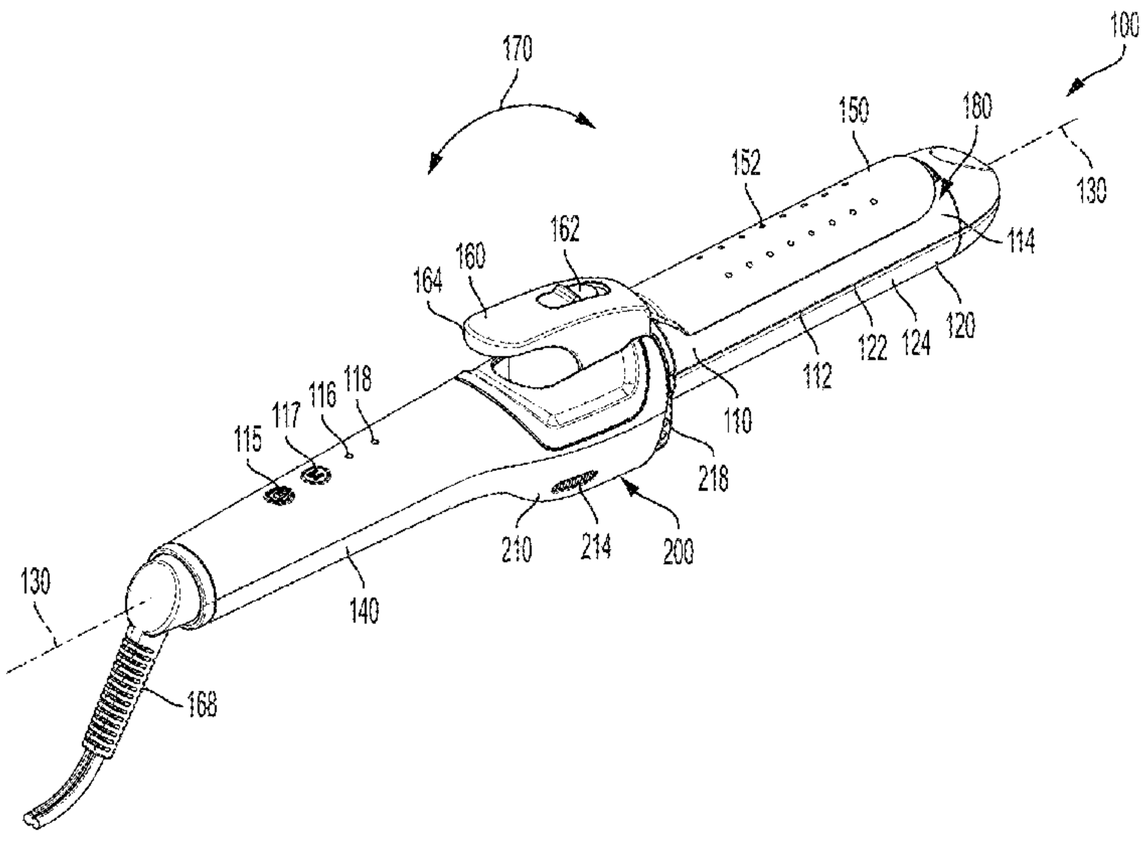
(Continued)

Primary Examiner — Cris L. Rodriguez
Assistant Examiner — Karim Asqiriba
(74) *Attorney, Agent, or Firm* — Ruggiero McAllister & McMahon LLC

(57) **ABSTRACT**

A hair styling apparatus includes a first member and a second member extending along a central longitudinal axis. The first member and the second member are configured for relative movement between an open position for receiving hair therebetween and an approximated position. The first member and second member each include an inner plate segment and an outer shell segment. The first member and the second member are each configured to impart a straightening effect on hair when clamped with the inner plate segment. A heating assembly is connected via the inner plate segment to the first member and the second member. At least one ion emitter is for generating ions upon activation of the hair styling apparatus.

13 Claims, 6 Drawing Sheets



(56) **References Cited**

U.S. PATENT DOCUMENTS

2007/0085036	A1*	4/2007	Santhouse	A45D 20/12 250/492.21
2013/0247407	A1	9/2013	Richmond et al.	
2016/0166037	A1*	6/2016	Teramoto	A45D 1/04 132/271
2017/0196333	A1*	7/2017	Leung	A45D 2/12
2018/0177272	A1*	6/2018	Nakasone	A45D 1/06

FOREIGN PATENT DOCUMENTS

CN	203575843	U *	5/2014	A45D 1/04
CN	203575843	U	5/2014	
EP	2 433 519	A1	3/2012	
JP	2003-310339	A	11/2003	
JP	P2011-5130	A	1/2011	
JP	P2011-5145	A	1/2011	
JP	5260776	P	5/2013	
JP	5663400	P	12/2014	
JP	2015-10448	A	6/2015	
KR	10-1144163		5/2012	
KR	10-1842932		3/2018	

OTHER PUBLICATIONS

International Search Report dated Dec. 8, 2021 from corresponding International Patent Application No. PCT/US2021/045357, 2 pages.
Written Opinion dated Dec. 8, 2021 from corresponding International Patent Application No. PCT/US2021/045357, 6 pages.

* cited by examiner

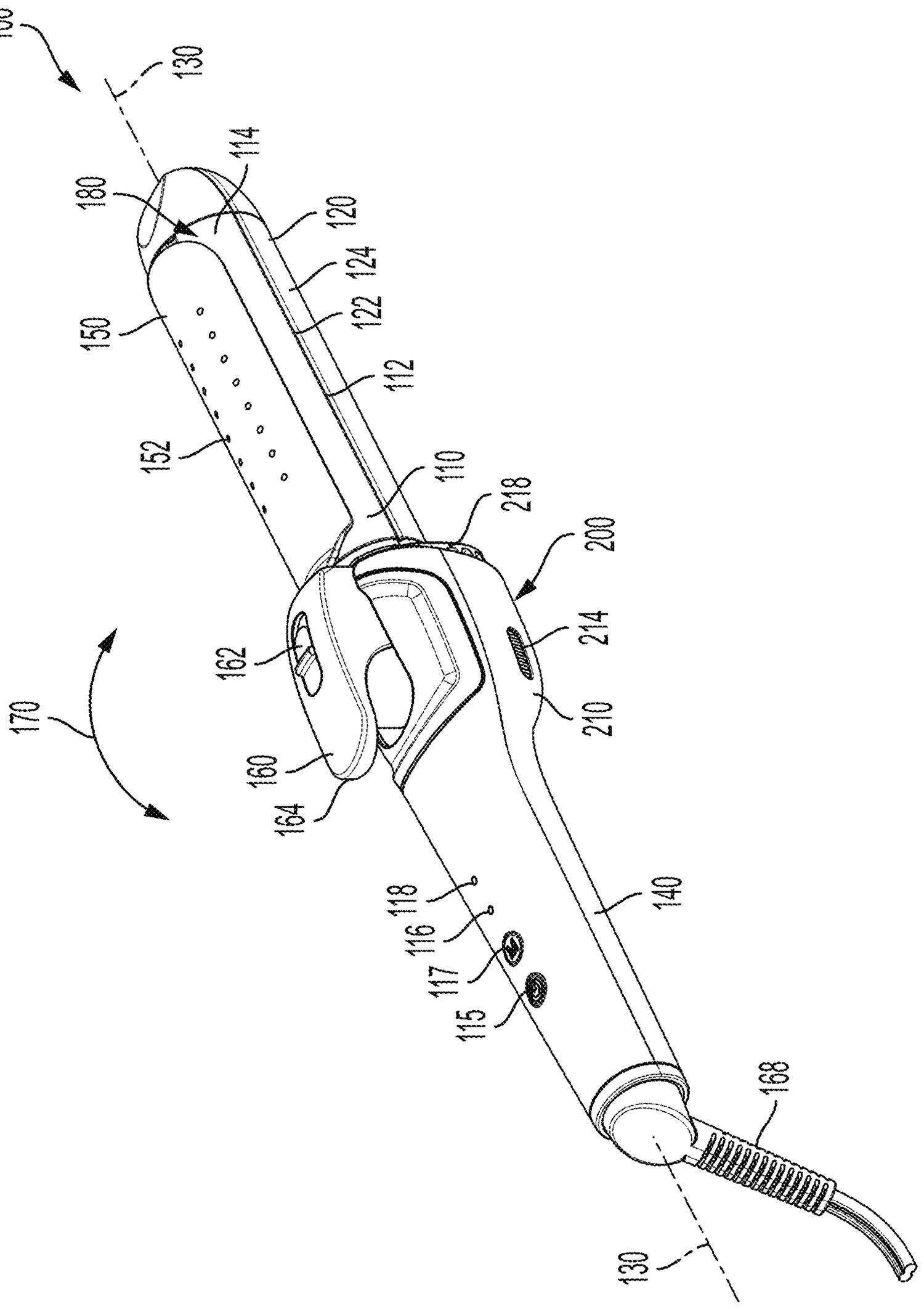

100
130
114
180
120
124
122
150
112
152
110
218
200
214
162
210
170
160
164
118
116
117
115
140
168
130

FIG. 1

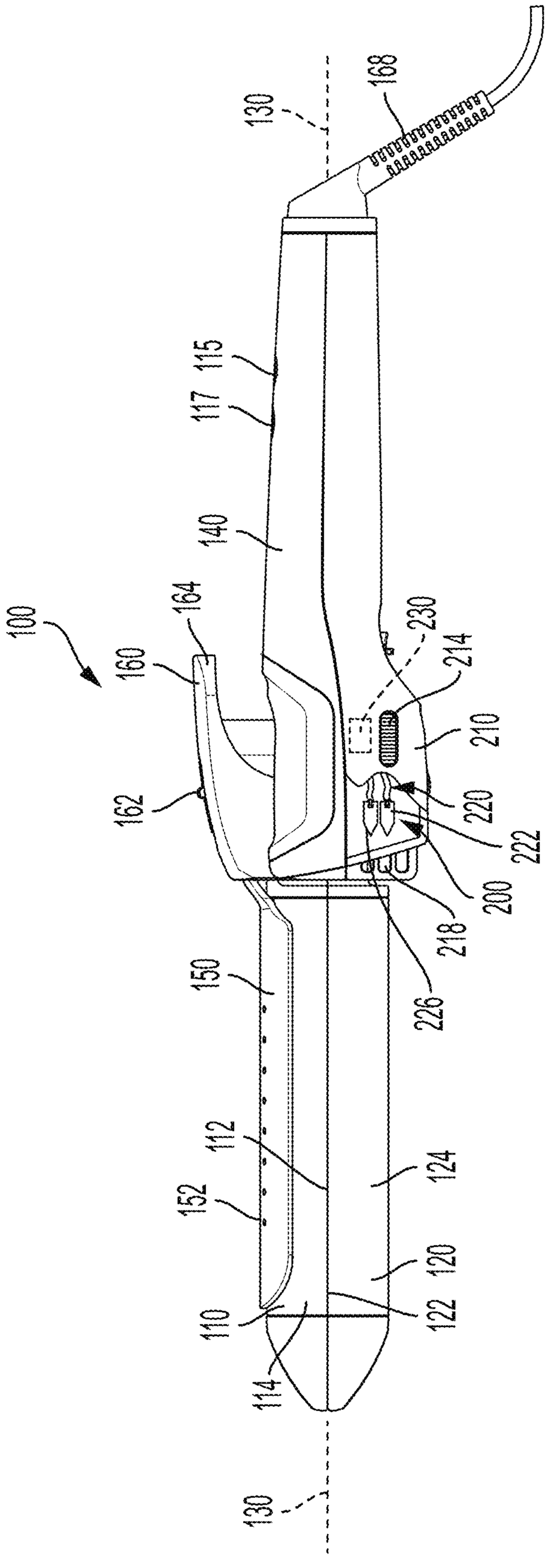

130
168
115
117
140
164
100
160
230
214
210
162
220
222
200
218
150
226
112
124
152
120
110
122
114
130

FIG. 2

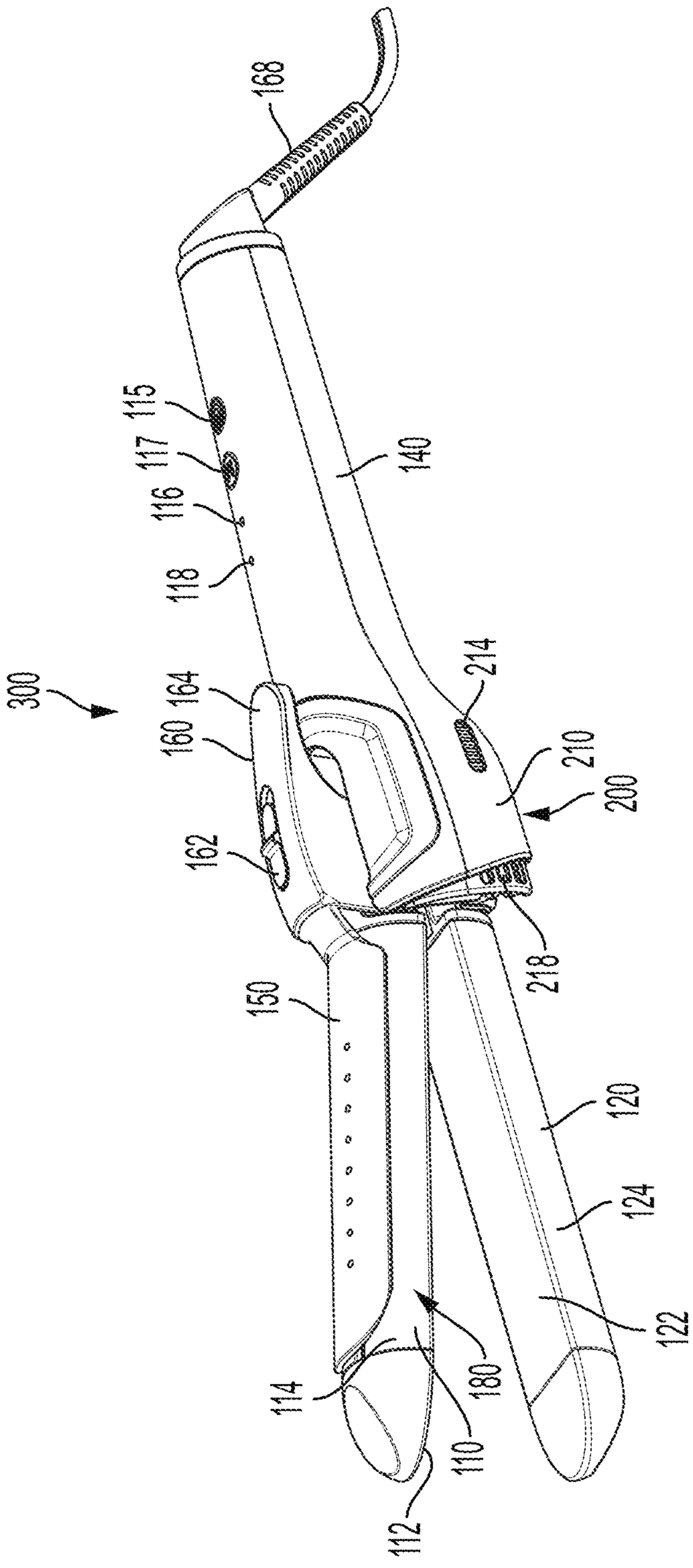

168
115
117
116
118
140
300
164
160
214
210
200
162
218
150
120
124
122
114
180
110
112

FIG. 3

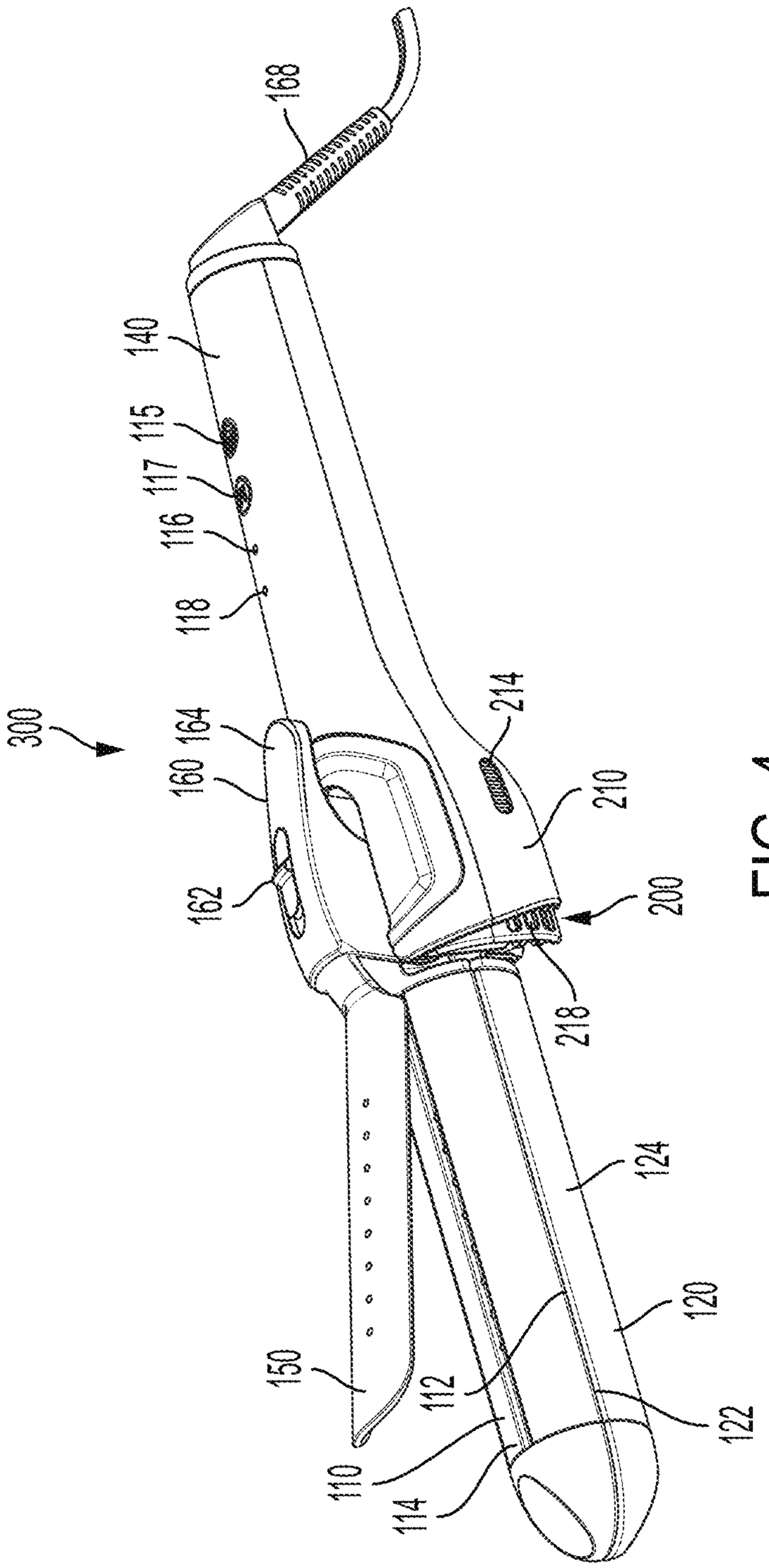

168
140
115
117
116
118
300
164
160
162
214
210
200
218
124
120
122
112
110
114
150

FIG. 4

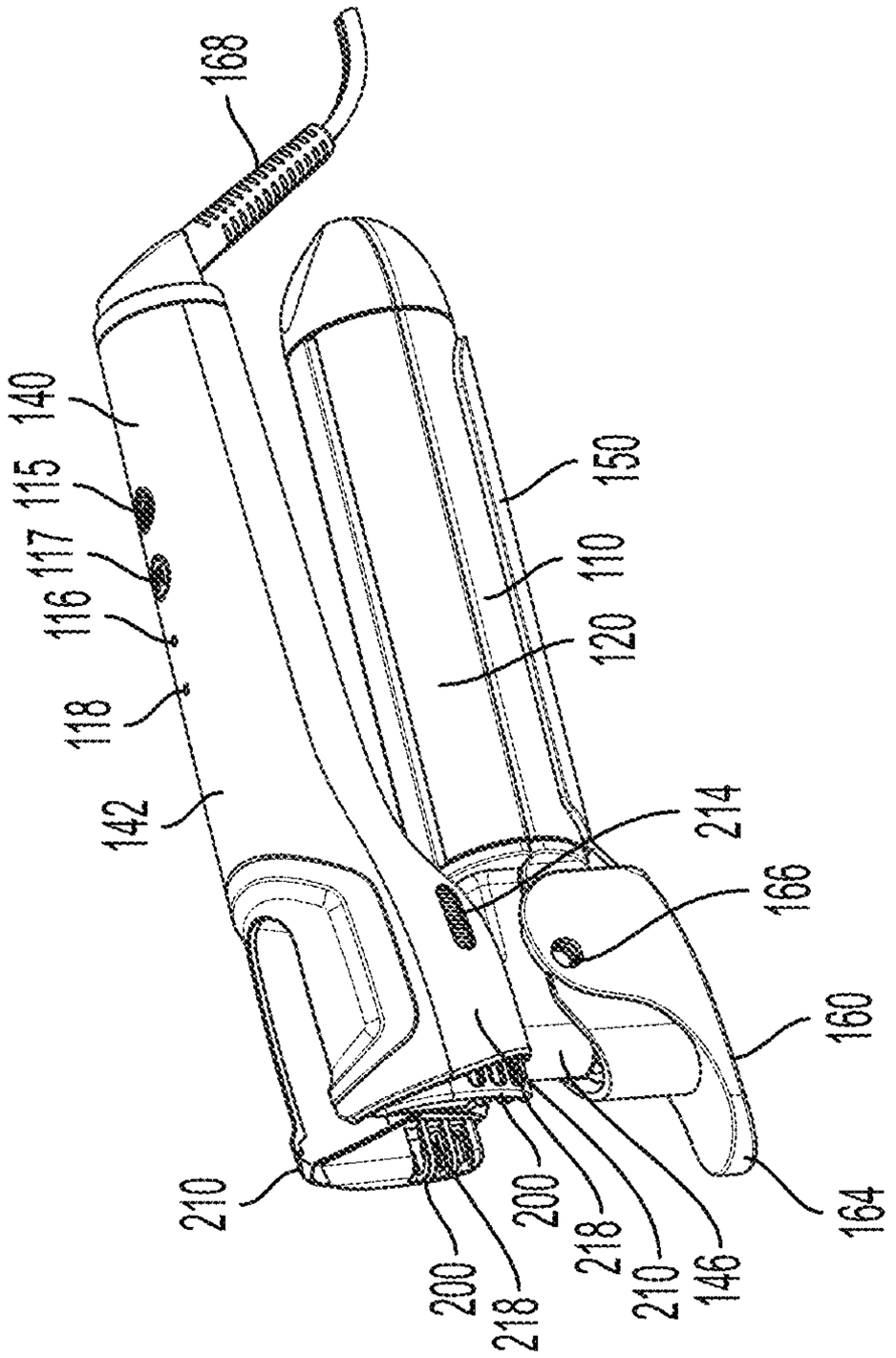

168
140
115
117
116
118
142
150
110
120
214
166
160
164
210
200
218
146

FIG. 5

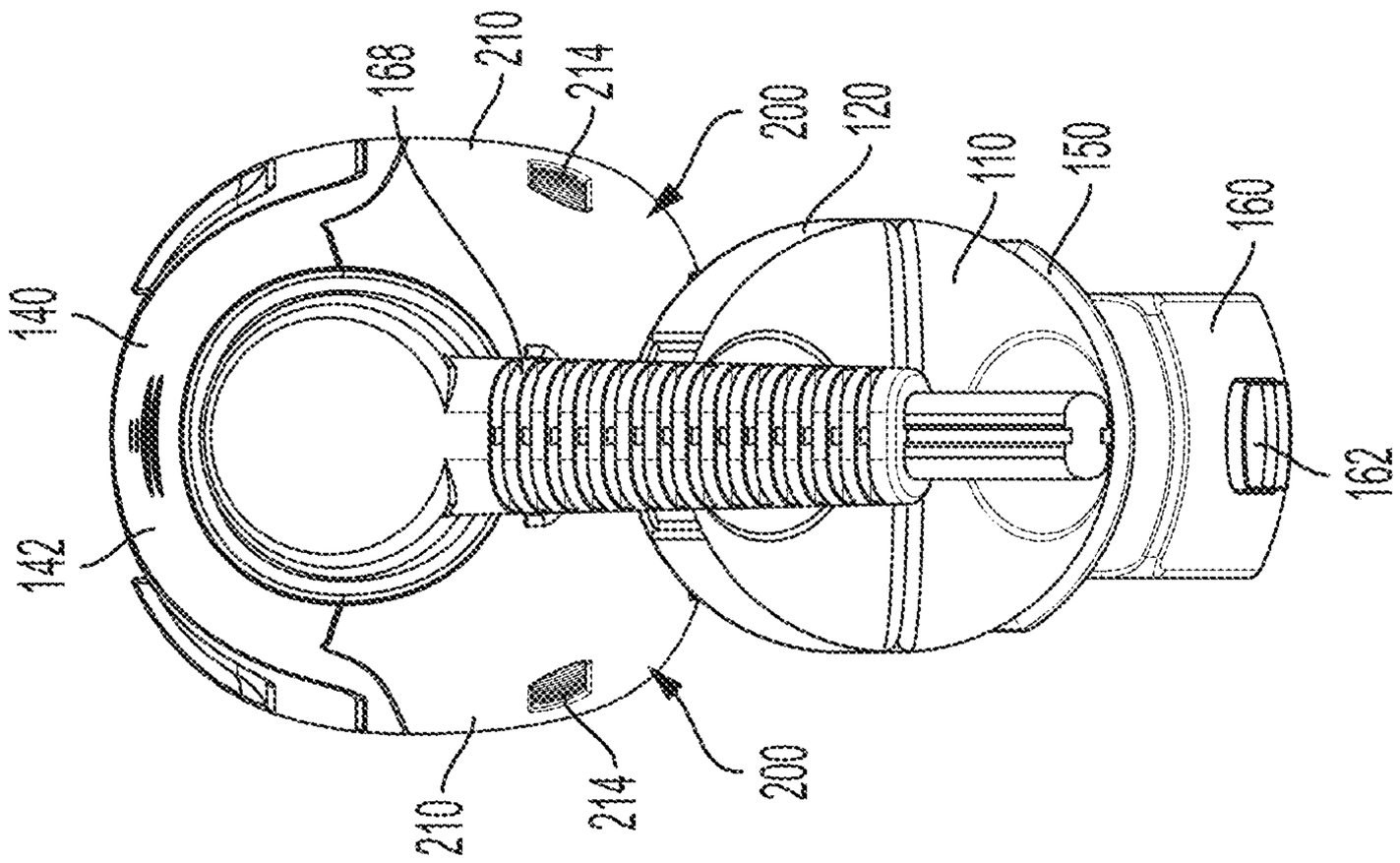

168
210
214
200
120
110
150
160
140
142
162
210
214
200

FIG. 7

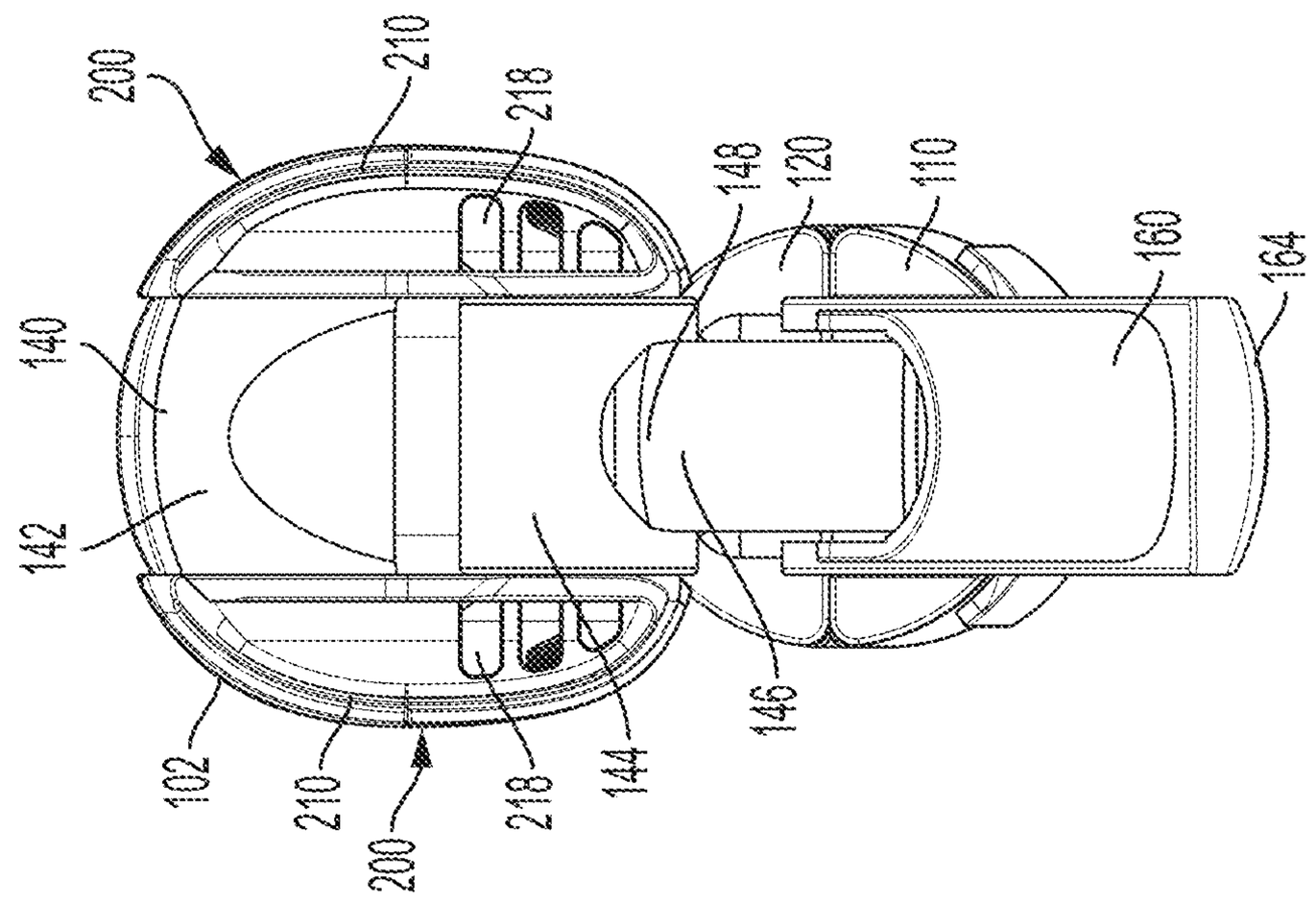

200
210
218
148
120
110
160
164
140
142
102
210
200
218
144
146

FIG. 6

HAIR STYLING APPARATUS WITH ION EMITTER

BACKGROUND OF THE DISCLOSURE

1. Field of the Disclosure

The present disclosure relates to devices for styling hair. The present disclosure further relates to a hair styling apparatus with ion emitter.

2. Description of the Related Art

Delivering ions or ionically charged molecules to a person's hair provides benefits including the removal of undesirable static charge that naturally occurs in hair. For example, U.S. Pat. No. 7,644,511 filed Jun. 27, 2007 ("Ishikawa") provides a hair dryer that discharges ions. In particular, Ishikawa provides a hair dryer that has a main body housing having an inlet port and a discharge port, an air flow path with the air flow path extending from the inlet port to the discharge port and a bypass flow path with the bypass flow path branching off from the air flow path and leading to an ion emission port. Further, Ishikawa requires an auxiliary air inlet associated with the ion emission port. This structure results in the auxiliary air inlet and the ion emission port being in communication with the hair dryer's main inlet and outlet.

SUMMARY OF THE DISCLOSURE

A hair styling apparatus that is a 2-in-1 styler that emits ions while functioning as a curling iron or a hair straightener is provided.

A hair styling apparatus is further provided with an ion emitter in a housing that has an inlet and an outlet that are not in communication with a hair dryer's main inlet and outlet.

A hair styling apparatus embodiment is provided that includes a first member and a second member extending along a central longitudinal axis. The first member and the second member are configured for relative movement between an open position for receiving hair therebetween and an approximated position. The first member and second member each include an inner plate segment and an outer shell segment. The first member and the second member are each configured to impart a straightening effect on hair when clamped with the inner plate segment. A heating assembly is connected via the inner plate segment to the first member and the second member. At least one ion emitter is for generating ions upon activation of the hair styling apparatus.

The above and other objects, features, and advantages of the present disclosure will be apparent and understood by those skilled in the art from the following detailed description, drawings, and accompanying claims. As shown throughout the drawings, like reference numerals designate like or corresponding parts.

BRIEF DESCRIPTION OF THE DRAWINGS

The present disclosure will be more completely understood in consideration of the following detailed description in connection with the accompanying drawings, in which:

FIG. **1** is a top, rear perspective view of a hair styling apparatus having an ion emitter of the present disclosure.

FIG. **2** is a side view of the hair styling apparatus of FIG. **1** having a portion of a housing removed.

FIG. **3** is a top, front perspective view of the hair styling apparatus of FIG. **1** in an open position of a straightening configuration.

FIG. **4** is a top, front perspective view of the hair styling apparatus of FIG. **1** in a spaced apart position of a curling configuration.

FIG. **5** is a top, front perspective view of the hair styling apparatus of FIG. **1** in a folded position.

FIG. **6** is a front view of the hair styling apparatus of FIG. **1** in the folded position.

FIG. **7** is a rear view of the hair styling apparatus of FIG. **1** in the folded position.

DETAILED DESCRIPTION OF THE DISCLOSURE

Referring to FIGS. **1** and **2**, there is provided a hair styling apparatus generally represented by reference numeral **100** having two ion emitter assemblies **200**. Alternatively, hair styling apparatus **100** has only one ion emitter assembly **200** or more than two ion emitter assemblies **200**. Hair styling apparatus **100** is a 2-in-1 styler that emits ions while functioning as a curling iron or a hair straightening iron.

Referring to FIG. **1**, hair styling apparatus **100** has a first member **110** and a second member **120** that extend along a central longitudinal axis **130**. First member **110** is shaped to have a flat surface **112** and a curve surface **114** opposite to flat surface **112**. Second member **120** has a shape that is a mirror image of first member **110** to have a flat surface **122** and a curve surface **124** opposite to flat surface **122**. Curve surfaces **114**, **124** each form an outer shell segment. First member **110** and second member **120** are connected to a handle **140** so that at least one of first member **110** and second member **120** are movable relative to each other. Handle **140** preferably has a shape to be griped by a user. Handle **140** is connected to a housing **210** of each of ion emitter assemblies **200**. Handle **140** and housing **210** are shown as being formed by one piece. However, housing **210** can be formed separately, and, then, connected to handle **140**. Housing **210** has an air inlet **214** and an air outlet **218**. Air inlet **214** is through a side of handle **140** and has openings to allow air to therethrough. The openings of air inlet **214** are sized to prevent fingers passing through the openings of air inlet **214**. Air outlet **218** is through a front of handle **140** and has openings to allow air to therethrough. The openings of air outlet **218** are sized to prevent fingers passing through the openings of air outlet **218**.

First member **110** and second member **120** are made of conductive materials. Handle **140** is made of an insulative material.

Hair styling apparatus **100** has a clamp segment **150**. Clamp segment **150** is shaped to mate with first member **110**. Clamp segment **150** has one or more holes, preferably two or more holes **152**. Clamp segment **150** is connected to a lever **160**. Lever **160** is connected to handle **140** by a hinge **166** that is shown in FIG. **5** so that lever **160** selectively rotates about the hinge in directions as shown by arrows **170** toward and away from handle **140** when a force is applied to a user engageable portion **164** of lever **160**. Lever **160** is connected to a biasing mechanism, for example, a spring, that biases lever **160** to a position as shown in FIG. **1**. Lever **160** has a function button **162**. Function button **162** is selectively movable between a curling iron position as shown in FIG. **1** and a straightener position as shown in FIG. **3**. When button **162** is in the curling iron position, button **162** disconnects lever **160** from first member **110** while button **162** is connected to clamp segment **150** so that clamp

segment **150** moves with lever **160** about hinge **166** and first member **110** is not moved by lever **160** and is maintained in the approximated position. When button **162** is in the straightener position, button **162** connects first member **110** to lever **160** so that first member **110** and clamp segment **150** move together with lever **160** about the hinge. Clamp segment **150** is made of conductive materials or include conductive components. Lever **160** is made of insulative materials.

Referring again to FIG. **1**, handle **110** has a power button **115** and an ion button **117**. Power button **115** is selectively depressed to turn hair styling apparatus **100** on and off. Ion button **117** selectively activates or deactivates generation of ions by ion generator assemblies **200**. Handle **140** has a power indicator light **116** that is illuminated only when hair styling apparatus **100** is on and a ion indicator light **118** that provides an indication of whether ions are generated by ion generator assemblies **200**, for example, by illuminating only when ions are being generated by ion generator assembly **200**. Power indicator light **116** and ion indicator light **118** can be LED lights. Handle **140** is connected to a power cord **168** that supplies power. Power cord **168** can supply power to a heater assembly **180** of hair styling apparatus **100**. Heater assembly **180** conducts heat to one or more of clamp segment **150**, first member **110** and second member **120** when power button **115** has been depressed turning on hair styling apparatus **100**.

Referring to FIG. **2**, each ion emitter assembly **200** has an ion emitter **220** inside housing **210**. Ion emitter **220** has a negative ion emitter **222** and a positive ion emitter **226**. Accordingly, there is one pair of positive ion emitter **226** and negative ion emitter **222**. Both positive ion emitter **226** and negative ion emitter **222** are located inside of air outlet **218**. The openings of air inlet **214** and the openings of air outlet **218** allow air to pass through. Since auxiliary air will be drawn in circulation for positive ion emitter **226** and negative ion emitter **222**, this will bring extra positive and negative ions that are emitted out of housing **210**. This, in other words, helps to increase a total amount of positive and negative ions during use of hair styling apparatus **100**. Airflow can pass through the openings of air inlet **214** and the openings of air outlet **218** during use without an airflow generator. Alternatively, the airflow can be generated by an airflow generator **230** that draws air into air inlet **214** and expels air through air outlet **218**, for example, a fan in housing **210**.

Referring to FIG. **3**, in use, a user connects power cord **168** to a power source, for example, a plug in an electrical outlet. The user depresses power button **115** to turn hair styling apparatus **100** on supplying power to heater assembly **180** to heat one or more of clamp segment **150**, first member **110** and second member **120**. The user can determine if ion generator assemblies **200** are generating ions by ion indicator light **118**. If ion indicator light **118** is illuminated, then ion generator assemblies **200** are generating ions. If ion indicator light **118** is not illuminated, then ion generator assemblies **200** are not generating ions and the user can depress ion button **117** supplying power to ion generator assemblies **200** to generate ions. When user depresses ion button **117**, power can also be supplied to airflow generator **230** to draw air into air inlet **214** and expels air through air outlet **218** creating an airflow to move ions out of air outlet **218**. If the user does not desire ions to be emitted during use of hair styling apparatus **100**, then the user can depress ion button **117** to stop supply of power to ion generator assemblies **200**, or ion generator assemblies **200** and airflow generator **230**, to stop generating ions. When the user has completed use of hair styling apparatus **100** the user depresses power button **115** to turn hair styling apparatus **100** off that stops supply of power to all of ion emitter assemblies **200**, heater assembly **180**, airflow generator **230**, and any combination thereof.

To use hair styling apparatus **100** in the straightening configuration, the user determines if hair styling apparatus **100** is in the straightening configuration as indicated by a position of function button **162**. As shown in FIG. **3**, hair styling apparatus **100** is in the straightening configuration. However, if function button **162** is in the curling configuration, the user can apply a force to function button **162** to move function button **162** from the position of FIG. **1** to the position shown in in FIG. **3** to connect lever **160** with first member **110**. First member **110** is configured for movement relative to second member **120** between an open position for receiving hair therebetween, as shown in FIG. **3**, and an approximated position, as shown in FIG. **1**. The user applies a force in a direction as shown by arrow **300** on engageable portion **164** to push lever **160** from the approximated position to the open position to insert the user's hair. The user releases the force applied to engageable portion **164** in the direction as shown by arrow **300** allowing the biasing mechanism to move first member **110** closer to second member **120** clamping the user's hair between first member **110** closer to second member **120**. Flat surfaces **112**,**122** each form an inner plate segment configured to impart a straightening effect on the user's hair when the user's hair is clamped between first member **110** and second member **120**. Heat is generated by heater assembly **180** that is conducted to flat surfaces **112**,**122**. Flat surfaces **112**, **122** apply heat to the hair to impart the straightening effect. If ion emitter assemblies **200** are activated, then each ion emitter assembly **200** draws auxiliary air in circulation for positive ion emitter **226** and negative ion emitter **222** to bring extra positive and negative ions that are emitted out of housing **210** into contact with the user's hair while the user's hair is clamped between first member **110** and second member **120**. The positive and negative ions can remove undesirable static charge that naturally occurs in hair. Removal of static charge provides benefits, e.g., smooth hair, no static fly-aways, reduced frizz. The user applies a force in the direction as shown by arrow **300** on engageable portion **164** to push lever **160** to the open position to release the user's hair. The user can then insert the same or a different section of the user's hair between first member **110** and second member **120** to impart the straightening effect.

Referring to FIG. **4**, to use hair styling apparatus **100** in the curling configuration, the user determines if hair styling apparatus **100** is in the curling configuration as indicated by a position of function button **162**. As shown in FIG. **4**, hair styling apparatus **100** is in the curling configuration. However, if function button **162** is in the straightening configuration, the user can apply a force to function button **122** to move function button **162** from the position of FIG. **3** to the position shown in in FIG. **4** to disconnect lever **160** from first member **110** while button **162** is connected to clamp segment **150** so that clamp segment **150** moves with lever **160** about the hinge and first member **110** is not moved by lever **160** and is maintained in the approximated position. The user applies a force in a direction as shown by arrow **300** on engageable portion **164** to push lever **160** from the closed position to the spaced apart position to insert the user's hair. The user releases the force applied to engageable portion **164** in the direction as shown by arrow **300** allowing the biasing mechanism to move clamp segment **150** closer to first member **110** clamping the user's hair between clamp

segment **150** and first member **110**. The heat applied by heater assembly **180** to one or more of clamp segment **150**, first member **110** and second member **120** while the user's hair is clamped between clamp segment **150** and first member **110** imparts a curling effect to the user's hair. If ion emitter assemblies **200** are activated, then each ion emitter assembly **200** draws auxiliary air in circulation for positive ion emitter **226** and negative ion emitter **222** to bring extra positive and negative ions that are emitted out of housing **210** into contact with the user's hair while the user's hair is clamped between clamp segment **150** and first member **110**. The positive and negative ions can remove undesirable static charge that naturally occurs in hair. Removal of static charge provides benefits, e.g., smooth hair, no static fly-aways, reduced frizz. The user applies a force in the direction as shown by arrow **300** on engageable portion **164** to push lever **160** to the open position to release the user's hair. The user can then insert the same or a different section of the user's hair between clamp segment **150** and first member **110** to impart the curling effect.

Referring to FIGS. **5-7**, handle **110** is foldable. Handle **140** has a first section **142** and a second section **146**. First section **142** is connected to second section **146** so that first section **142** and second section **146** are rotatable relative to one another.

Referring to FIG. **6**, first section **142** has an outer connector **144** and second section **146** has an inner connector **148**. Outer connector **144** and inner connector **148** are on a side of handle opposite to power button **115**. Outer connector **144** is connected on opposite sides of inner connector **148** to form a hinge connection. For example, inner connector **148** has an opening and a pin passes through the opening in inner connector **148** and outer connector **144** connects to opposite sides of the pin. Second section **146** rotates first member **110** and second member **120** relative to first section **142** between an extended position, as shown in FIG. **1**, and a folded position as shown in FIG. **5**. Accordingly, hair styling apparatus **100** in the folded position is compact for storage or transportation.

Hair styling apparatus **100** including at least one ion emitter assembly **200** in housing **210** that has air inlet **214** and air outlet **218** that are not in communication with a hair dryer's main inlet and outlet overcome the disadvantages associated therewith. Further, hair styling apparatus **100** that has at least one ion emitter assembly **200** provides all the benefits of discharging positive and negative ions while straightening or curling the user's hair.

While the present disclosure has been described with reference to one or more exemplary embodiments, it will be understood by those skilled in the art, that various changes can be made, and equivalents can be substituted for elements thereof without departing from the scope of the present disclosure. In addition, many modifications can be made to adapt a particular situation or material to the teachings of the present disclosure without departing from the scope thereof. Therefore, it is intended that the present disclosure will not be limited to the particular embodiments disclosed herein, but that the disclosure will include all aspects falling within the scope of a fair reading of appended claims.

The invention claimed is:

1. A hair styling apparatus comprising:

a first member and a second member extending along a central longitudinal axis, the first member and the second member being configured for relative movement between an open position for receiving hair therebetween and an approximated position, the first member and second member each including an inner plate segment and an outer shell segment, wherein the first member and the second member are each configured to impart a straightening effect on hair when clamped with the inner plate segment,

a heating assembly connected via the inner plate segment to the first member and the second member; and

at least one ion emitter for generating ions upon activation of the hair styling apparatus,

wherein the first member and the second member are connected to a handle,

wherein the at least one ion emitter is in a housing on the handle,

wherein the housing has a front and at least one side, and an air inlet and an air outlet on opposite sides of the housing, and wherein the air inlet and the air outlet are positioned on the handle, wherein the air inlet is through the side of the handle and has openings to allow air therethrough, and wherein the air outlet is through the front of the handle and has openings to allow air therethrough.

2. The hair styling apparatus of claim **1**, wherein the housing has an airflow generator that draws air into the air inlet and expels air through the air outlet.

3. The hair styling apparatus of claim **2**, wherein the airflow generator is a fan in the housing.

4. The hair styling apparatus of claim **1**, wherein the ion emitter has a positive ion emitter and a negative ion emitter.

5. The hair styling apparatus of claim **1**, wherein the ion emitter is a first ion emitter and further comprising a second ion emitter.

6. The hair styling apparatus of claim **5**, wherein the first ion emitter is in a first housing that is connected to the handle and the second ion emitter is in a second housing that is connected to the handle, and wherein the first housing has the air inlet and the air outlet and the second housing has an air inlet and an air outlet.

7. The hair styling apparatus of claim **6**, further comprising an airflow generator that draws air into the air inlet of the first housing and expels air through the air outlet of the first housing generating an airflow including positive and negative ions out of the first housing.

8. The hair styling apparatus of claim **6**, further comprising a first airflow generator that draws air into the air inlet of the first housing and expels air through the air outlet of the first housing and a second airflow generator that draws air into the air inlet of the second housing and expels air through the air outlet of the second housing.

9. The hair styling apparatus of claim **1**, wherein the first member and the second member are in the approximated position when in a curling configuration, and further comprising a clamp segment connected to the first member configured for relative movement between a spaced apart position for receiving hair between the clamp segment and the first member and a closed position.

10. The hair styling apparatus of claim **9**, wherein the clamp segment is configured to be in the closed position while the first and second members are movable between the open position and the approximated position in a straightening configuration.

11. The hair styling apparatus of claim **9**, wherein the clamp segment is connected to a lever that selectively moves the clamp segment between the spaced apart position and the closed position, and wherein the lever has a button that is movable between a straightening position for the straightening configuration and a curling iron position for the curling configuration.

12. The hair styling apparatus of claim 11, wherein, when the button is in the curling iron position, the button disconnects the lever from the first member so that only the clamp segment moves with the lever and, when the button is in the straightener position, the button connects the first member to the lever so that the first member moves with the lever.

13. A hair styling apparatus comprising:

a first member and a second member extending along a central longitudinal axis, the first member and the second member being configured for relative movement between an open position for receiving hair therebetween and an approximated position, the first member and second member each including an inner plate segment and an outer shell segment, wherein the first member and the second member are each configured to impart a straightening effect on hair when clamped with the inner plate segment,

a heating assembly connected via the inner plate segment to the first member and the second member; and

at least one ion emitter for generating ions upon activation of the hair styling apparatus that is in a housing on a handle, wherein the first member, the second member and the handle are configured for relative movement between an extended position and a folded position,

wherein the housing has a front and at least one side, and an air inlet and an air outlet on opposite sides of the housing, wherein the air inlet and the air outlet are positioned on the handle, wherein the air inlet is through the side of the handle and has openings to allow air therethrough, and wherein the air outlet is through the front of the handle and has openings to allow air therethrough.

* * * * *